U.S. ARMY RESPONSES TO U.S. EPA COMMENTS ON THE DRAFT AREA 1 FIELD SAMPLING PLAN ADDENDUM TO REMEDIAL INVESTIGATION WORK PLAN FOR PFAS
Former Fort Devens Army Installation, Devens, Massachusetts
8 August 2018

The following Army responses pertain to the U.S. Environmental Protection Agency (EPA) comments, dated 1 August 2018, on the draft *Area 1 Field Sampling Plan, Addendum to Remedial Investigation Work Plan for Per- and Polyfluoroalkyl Substances (PFAS), Former Fort Devens Army Installation, Devens, MA*, dated June 2018.

General Comments

Comment #1: Per EPA's (Ginny Lombardo) April 30, 2018 email to Army (Andy Van dyke), Army was required to submit a CERCLA RI Work Plan for the base-wide investigation of PFAS and area- specific Sampling and Analysis Plans (SAPs) for each phase of proposed field work (i.e. Areas 1, 2 and 3). Although Army had originally planned to prepare the RI Work Plan in accordance with 2012 UFP QAPP guidance, given the significance of this field effort and level of scrutiny that it will undoubtedly receive, EPA determined that the UFP-QAPP as a stand-along document would not satisfy the CERCLA requirements of an RI Work Plan. To ensure consistency with the CERCLA RI process and expedite commencement of field work, EPA informed Army that it must prepare and submit, for regulatory review and comment, a draft SAP (i.e. Field Sampling Plan (FSP) and QAPP) for Area 1. In addition, to ensure timely review and comment and implementation of the Area 1 field sampling program in accordance with Army's proposed schedule, EPA recommended that Army prepare the Area 1 SAP and the base-wide RI Work Plan on separate timelines. Follow-on SAPs for Areas 2 and 3 would then be provided over time as addendums to the Area 1 SAP. Ultimately, the Final RI Work Plan for the base-wide PFAS investigation would incorporate the initial SAP for Area 1, as amended for other areas, to form the completed RI Work Plan documentation.

On June 29, 2018, EPA received electronic copies of the draft PFAS RI Work Plan (and attached draft QAPP) and a draft Area 1 Field Sampling Plan (FSP) (hard (paper) copies of these documents were never received). Unfortunately, the documents do not follow the instructions laid out in EPA's April 30, 2018 email and, more importantly, do not comply with the process and requirements set forth in CERCLA for the preparation of site- specific SAPs and RI Work Plans. Despite these shortcomings, EPA provides the following comments and recommendations on the draft Area 1 FSP to allow for the timely collection of preliminary field data from Area 1. Comments on the draft base-wide RI Work Plan (and base-wide QAPP) will be provided upon receipt and review of the draft risk assessment portion of the draft work plan (which was unexpectedly removed from the June 29, 2018 submittal just prior to its release). To ensure the integrity of the CERCLA process moving forward and to ensure timely implementation of subsequent field efforts (for Areas 2 and 3), it is imperative that Army comply with the above-mentioned requirements and recommendations. Failure to do so may result in EPA's immediate disapproval of these submittals in accordance with the provisions set forth in the Devens FFA.

Response: The work plan schedule noted that draft documents would be provided in electronic format only. This was to expedite the delivery of the documents. The format of area-specific FSPs was created in order to expedite getting into the field to collect data. On June 29, 2018, the Army provided a PFAS RI work plan, a base-wide PFAS QAPP, and the Area 1 FSP. The Area 1 FSP combined with the base-wide PFAS QAPP serves as

the Area 1 SAP. As the Area 2 and 3 FSPs are written, they will be provided to EPA for review. The Area 2 and 3 FSPs, combined with the base-wide PFAS QAPP serves as the Area 2 and Area 3 SAPs. This plan for the documents and outlines for the documents were discussed during the April 25, 2018 BCT meeting. The outlines were provided on May 2, 2018. EPA comments on the outlines received on May 4, 2018 were considered during development of the documents. The EPA comments did not indicate that the planned documents (i.e., PFAS RI work plan, a base-wide PFAS QAPP, and the Area 1 FSP) would not meet EPA's expectations. The Army believes delivery of the PFAS RI work plan, a base-wide PFAS QAPP, and the Area 1 FSP met the expectations of EPA as outlined in EPA's April 30, 2018 email.

Comment #2: As stated on page 22 of the May 2018, Final PFAS SI Report, based on results of the SI and presence of PFOA and PFOS in soil and groundwater at each of the SAs and AOCs sampled, Army recommended that a RI Work Plan be prepared to focus on the following:

- Delineation of the source and extent of PFAS contamination impacting the MacPherson and Grove Pond water supply wells;
- Evaluation of all areas and all media where PFAS was detected during the SI.
- Evaluation of potential off-site impacts within a one- and four-mile radius of detected PFAS concentrations in groundwater exceeding the EPA LHA (70 ppt).

While the field work proposed in the draft Area 1 FSP will expand the existing SI database for each of the 14 confirmed PFAS AOCs, the currently proposed sampling program is inadequate for purposes of meeting the objectives identified in the May 2018 SI Report and for complying with requirements for conducting a CERCLA RI.

As noted in EPA's June 25, 2018 comments on minutes of the May 24, 2018, Area 1 sampling design conference call, Army's decision to forego many of the data collection activities identified by EPA as critical to the successful performance of a CERCLA RI will undoubtedly extend the timeframe required to complete the Area 1 sampling program and delay completion of the base-wide PFAS RI. While Army has expressed a willingness to expand the proposed Area 1 sampling program as part of a subsequent field effort, this approach is contrary to discussions at the June 15, 2018 meeting between EPA, OSD, Army, MassDEP, MassDevelopment and representatives from Devens and Ayer and inconsistent with current DoD and EPA guidance for characterizing the nature and extent of contamination and evaluating risks to human and the environment posed by existing site conditions. Specific proposals and recommendations for expediting and enhancing the proposed sampling program are reiterated in the page-specific comments below.

Response: As discussed and agreed by EPA, Army, MassDEP, MassDevelopment, during BCT meetings on April 4, April 25, and May 24, 2018, the Army's work plan presents an adaptive/dynamic approach to determining the nature and extend of PFAS at Devens. The analytical data collected from the initial phase of sampling will be provided to the regulatory agencies as it is received so that it can quickly be reviewed and discussed, so that additional field activities can be adapted and conducted in a timely manner to accelerate the data collection in support of obtaining the objectives of the RI. The objectives include characterizing the nature and extent of contamination and evaluating risk to human health and the environment.

Within various sections of the FSP, there is text stating that data will be reviewed as it becomes available to guide additional field activities. The text will be revised to state that data from the laboratory will be shared with the stakeholders on a frequent (e.g., weekly)

basis to expedite review of the data, which will allow additional field activities to be expedited.

The Army believes that using data to determine the appropriate investigation activities is the most efficient and expeditious way to achieve the objectives of the RI.

Comment #3: A limited number of soil and groundwater drive point samples were collected during the PFAS SI that provided useful data for confirming or denying the presence of PFAS at each of the SAs and AOCs studied. One of the primary objectives of a CERCLA RI is to obtain a quality dataset that accurately and thoroughly defines/evaluates the nature and extent of PFOS and PFOA concentrations in soil (surface and shallow/deep overburden), groundwater (overburden and bedrock aquifer), sediments and surface water. To accomplish this objective, intrusive investigation activities that go beyond the currently proposed vertical profiling / direct push technology must be included in the initial phase of the Area 1 data collection effort. While useful for defining the boundaries of a known contaminant plume, confirming the presence or absence of contamination at a site, and/or defining site-specific geologic units (i.e. fill (artificially placed), native overburden, and bedrock), vertical profile samplers are often limited in their ability to meet the rigorous DQOs typically required of a CERCLA RI. EPA recommends that the FSP be expanded to include the concurrent vertical profiling of soils and groundwater in areas with confirmed PFAS detections utilizing sampling techniques and technologies (i.e. hollow-stem auger drilling and continuous split- spoon soil samplers) that can more accurately (and more expeditiously) characterize existing site conditions. At a minimum, permanent monitoring wells should be installed during the initial phase of the PFAS RI to replace the non-viable MNG wells and complete the transect of groundwater monitoring wells in this critical portion of Area 1. At AOCs 57 and 74, additional soil borings/monitoring wells should be installed on the downgradient side of Cold Spring Brook to verify the downgradient extent of PFAS contamination in this area.

EPA also recommends that a limited number of well couplets be installed during the initial phase of investigation consisting of a well set in shallow overburden (screened across the inferred groundwater table) a well set at the top of the competent bedrock/overburden interface. This is of critical importance in areas with little or no available bedrock groundwater quality data, which is the case for the majority of PFAS AOCs being investigated. At locations where overburden couplets are installed the deep overburden well should be installed first such that appropriate screen intervals can be selected for both the deep and shallow overburden well. Bedrock wells should be advanced at least 12 feet into competent bedrock, with a 10' screened interval installed at the base of the boring.

Response: The use of direct-push technology (DPT) is expected to meet the DQOs associated with this RI. DPT is a proven sampling technology that has been accepted and used at other Remedial Investigation sites in EPA Region 1 to collect representative soil and groundwater samples from both the unsaturated and saturated aquifer to the target depths anticipated to be required at Area 1 of Fort Devens. Furthermore, the advantages of DPT compared to hollow stem auger includes more efficient field characterization, reduced generation of investigation derived waste (IDW), and less susceptibility to heaving sands characteristic at depth within the glacial outwash deposits at Devens. In heaving sands, hollow-stem auger does not allow for accurate collection of soil samples at specific depth intervals. The dual-tube tooling used in DPT stabilizes ("cases") the formation, enabling efficient advancement and removal of soil core barrels (typically 5 ft in length) for field lithologic descriptions/sub-sampling and deployment of groundwater profiling tools (e.g. Geoprobe SP 22 Groundwater Sampler) in undisturbed formation ahead of the drill string. These systems provide excellent recoveries for soil cores. Larger borehole HSA (e.g. 4.25")

are much less cost effective and are prone to problems with heaving sands requiring introduction of water to stabilize borehole as the drill string is advanced. As indicated in the Area 1 FSP (Section 4), sonic drilling technology may also be utilized. It is anticipated sonic drilling technology will be used for vertical profiling if DPT cannot reach the necessary depths.

As described in Section 5.2.2 of the Area 1 FSP, based on EPA's request, the Army has included the installation of up to eight new overburden wells and two bedrock wells, if needed (i.e., if vertical profiling data indicate that PFAS contamination in the overburden extends to bedrock) in the Grove Pond investigation area. As previously requested by EPA, the tentative locations for new monitoring wells were shown on Figure 7 of the Area 1 FSP and several of these wells are anticipated to be in the vicinity of the non-viable MNG wells. However, the final locations and screen settings of the new groundwater monitoring wells will be based on a review of the PFAS data obtained from groundwater vertical profiling, soil sampling and existing monitoring wells. The final locations and screen depths will be reviewed with EPA and MassDEP.

As stated in Section 5.1.2 – AOC 57, 74, and 75 Sampling Plan, paragraph 1 of page 8; the potential for vertical hydraulic gradients in groundwater adjacent to Cold Spring Brook will be evaluated through the installation of overburden monitoring well couplets at AOCs 74 and 57. If groundwater vertical gradients measured at the well couplets and groundwater vertical profiling data collected from borings advanced on Devens adjacent to Cold Spring Brook indicate that the potential exists for PFAS groundwater contamination to underflow Cold Spring Brook then, as stated in Section 5.1.2 – AOC 57, 74 and 75 Sampling Plan, Groundwater Vertical Profiling, additional investigation further downgradient of AOCs 74 and 57 (i.e., on private property located across Cold Spring Brook) will be completed.

The groundwater vertical profiling data at Area 1 AOCs will be used to determine if PFAS is migrating toward the bedrock. If the vertical profiling data do not indicate the presence of PFAS near the overburden/bedrock interface, then the need to install a bedrock wells would not be necessary. However, if the groundwater vertical profiling data indicate that installation of bedrock monitoring wells is warranted then, as stated in paragraph 8 of Section 4.0 – General Remedial Investigation Approach, up to four bedrock monitoring wells are planned for Area 1.

EPA's recommendation to advance bedrock wells at least 12 feet into competent bedrock, with a 10-foot screened interval installed at the base of the boring, or to install open boreholes as indicated in the FSP, will be further considered during the design of the wells during the RI field work phase, based upon the observed conditions at the desired monitoring interval.

Comment #4: Drive-point data collected during the SI should not be used to determine the location of soil borings in the RI. As discussed above, to accurately determine the location and extent of PFAS contamination in site surface and subsurface soils and groundwater, soil borings should be advanced (using a continuous split spoon sampler) at 5' intervals commencing at ground surface to within two feet of the water table. (Thereafter, groundwater samples should be collected at 5' intervals from two feet below the top of the water table to bedrock). While useful for determining permanent monitoring well locations and screen settings, drive point data collected during the SI should not be used to locate/identify potential "hot spots" of PFAS contamination or to make decisions regarding groundwater flow gradients and direction. Data collected during the profiling work should be used to determine permanent monitoring well locations and screen settings for purposes of defining the boundaries of PFAS contamination in these media and confirm groundwater elevation and

flow gradients and direction. In addition, water level measurements from a limited number of temporary drive points should not be relied upon to accurately predict or support decisions regarding groundwater flow gradients and directions.

Response: The locations of proposed soil borings are shown on Figures 2 through 6 of the Area 1 FSP. These soil boring locations were chosen in consideration of the SI groundwater and soil results, as well as site history reported during the SI. The locations were also discussed with EPA during the Area 1 sampling rationale meeting on May 24, 2018. It is a reasonable approach to begin a sampling investigation by advancing soil borings at areas of reported AFFF application to the ground surface or, at AOCs with no known source of PFAS identified yet, at borings located upgradient, cross gradient and downgradient of known PFAS groundwater contamination. As stated on Page 2, paragraph 4 (General Remedial Approach) and page 7, paragraph 3 (AOC 57, 74 and 75 Sampling Plan) of the Area 1 FSP, if the groundwater vertical profiling and soil sampling results collected during this initial phase of RI investigation indicate that additional soil sampling and/or groundwater vertical profiling is warranted beyond the locations currently proposed for sampling, additional locations will be identified in consultation with EPA and MassDEP.

As presented on Page 7, Section 5.1.2, Soil Borings, characterization of the vadose zone aquifer materials will be completed during the initial phase of the Area 1 data collection effort through continuous coring of soil to the water table during advancement of each of the soil borings using DPT. As discussed in the response to EPA comment #3, DPT provides excellent recoveries for soil cores. Soil cores will be described in the field for field lithologic classification and soil samples from each boring to be collected for PFAS analysis.

Groundwater vertical profile samples will be collected at 10-foot intervals from the water table to bedrock in Area 1. A 10-foot sampling interval is expected to result in a reasonable number of samples needed to characterize the vertical extent of PFAS in the groundwater column associated with the approximately 100-foot think glacial overburden deposits in Area 1. This sampling interval has been used at similar groundwater investigations in glacial overburden deposits within EPA Region 1 and has been determined to provide data to adequately delineate the vertical distribution of contamination in groundwater.

The SI results were not used to make decisions regarding groundwater flow gradients and direction.

Data collected during the profiling work will be used to determine permanent monitoring well locations and screen settings for purposes of defining the boundaries of PFAS contamination in groundwater and confirm groundwater elevation and flow gradients and direction. This was described in Section 4.0 – General Remedial Investigation Approach and in Section 5.1.2 – AOC 57, 74, and 75 Sampling Plan of the Area 1 FSP.

The Area 1 FSP does not include utilizing water level measurements from temporary drive points.

Comment #5: The inclusion of field sampling activities that may or may not be conducted as part of the Area 1 RI is misleading and distorts the scope of the proposed sampling program for each of the PFAS AOCs. Consistent with EPA's comments on the draft slides for the June 19, 2018 RAB meeting, the FSP should be amended to clearly distinguish between the initial work to be performed (Phase 1) and the proposed work that may be performed (Phase 2), if deemed necessary based on data from the initial (Phase 1) work.

Response: The FSP will be clarified that the scope of some tasks (e.g., number, location, and design of permanent wells) will depend on the results of the initial sampling effort

(e.g., vertical profiles). This is viewed as part of the adaptive/dynamic site characterization approach that is currently described in the FSP and is intended to meet the objectives of the CERCLA RI. This will be an iterative approach which can address data gaps in real time while field work is ongoing, whereas a "phased" approach may imply re-mobilizations for supplemental work in the future.

It is expected that permanent wells will need to be installed following the initial profile sampling, thus the field activities specified in the FSP are correct. As indicated in the Area 1 FSP, monitoring wells will be installed as part of the RI. The ultimate number, location, and screen placement of the wells will be determined based on review of the vertical profiling data. The vertical profiling data will be provided to the regulators on a frequent (e.g., weekly) basis to make decisions on well placement and is not intended to consist of a separate "Phase" of investigation. With frequent data reviews, decisions regarding adjustments/improvements to subsequent sampling locations will be made more quickly than a longer-term "phased" investigation.

Comment #6: Preferential pathways for possible PFAS migration should be explored during or concurrent with implementation of the initial phase of RI work. Former and current underground utility corridors, sewer lines, floor and trench drains (and associated piping), catch basins, oil/water separators, storm water drainage systems (exterior trench drains) should be identified and evaluated as potential sources and/or conduits of PFAS contamination. Several of these features have already been identified as potential sources and conduits of contamination at AOC 50. Recent PFAS detections in surface water and sediment samples from locations associated with the storm water management system at AOC 50 confirm the likelihood of PFAS impacts associated with these features where present at each of the PFAS AOCs.

Response: As indicated in the last paragraph of Section 4, utility maps will be reviewed and evaluated as potential preferential pathways. It is anticipated that most historic subsurface structures and utilities are located at relatively shallow depths within the vadose zone and have bedding composed of natural glacial outwash or similar materials and would have similar hydraulic properties to surrounding undisturbed natural deposits and would not be likely preferential pathways for infiltrating surface water. However, mapping and characteristics will be considered.

Comment #7: Additional discussions are warranted regarding Army's continued reliance on its "regional groundwater flow model" (as presented in Army's April 2, 2018 paper entitled "Regional Groundwater Flow and Hydrogeology and Potential PFAS Impacts to Water Supply wells in the Areas surrounding Devens, MA") to support assumptions regarding site-specific groundwater flow gradients and directions, identify/evaluate potential PFAS source areas (i.e. back particle tracking) or support decisions related to the PFAS RI. As noted in EPA's (C. Keating) April 3, 2018 email to Army (R. Simeone), Army developed the "regional groundwater flow model" independent of the ongoing work to update the Shepley's Hill Landfill (SHL) groundwater flow model and without regulator input or involvement. As you may recall, EPA was adamantly opposed to the use of Army's regional model when it was first discussed at a BCT meeting early this year as a tool to help scope the PFAS RI. EPA was clear that use of site-specific data, either from historic site investigations or the upcoming PFAS RI was the only acceptable means of determining/document groundwater flow in and around known or suspected PFAS source areas. EPA requests that unless and until the regional model can be more thoroughly evaluated by MassDEP and EPA, all references to the model should be removed from the Area 1 FSP and base-wide PFAS RI Work Plan and that future reliance

of the model for decision-making purposes be terminated pending review and approval by all stakeholders.

Response: The regional groundwater flow model was not utilized in the Area 1 FSP and is not mentioned in the Area 1 FSP or the PFAS RI work plan.

The information presented in the regional model provides a synthesis of the currently available information on groundwater flow at Devens. It is understood that additional, site-specific data need to be collected during the RI to support decision-making.

Page-Specific Comments

Comment #1: Page 1, Section 2.0 – Please amend the discussion to include "the study goals, questions and decision statement summarized in Worksheet #11 (Data Quality Objectives) of the UFP-QAPP."

Response: In an overall effort to expedite the preparation and review of RI planning documents, information is generally not duplicated between the planning documents. The FSP is an addendum to the RI Work Plan which includes the QAPP. Section 2.0 of the FSP directly references Worksheet #11 of the QAPP. In preventing redundant information between the RI Work Plan, QAPP, and FSP, reviewers will have less content to review and all reviewers' comments on the same information can be addressed at one time in a uniform and consistent manner.

Comment #2: Page 2, Section 2.0 – For reasons discussed in the General Comments 2-6 above, the currently proposed sampling program is inadequate for purposes of meeting the objectives identified in the May 2018 SI Report and for complying with requirements for conducting a CERCLA RI. While Army has indicated its willingness to expand the currently proposed sampling program, if warranted, as part of a subsequent field effort, this phased approach to adequately characterize the nature and extent of PFAS contamination at each of the PFAS AOCs will undoubtedly extend the timeframe required to complete the base-wide investigation of PFAS at the former Fort Devens.

Response: The analytical data will be provided to the regulatory agencies on a frequent (e.g., weekly) basis so that it can quickly be reviewed, discussed, and additional field activities can be conducted in a timely manner to accelerate the data collection in support of obtaining the objectives of the RI. The objectives include characterizing the nature and extent of contamination and evaluating risk to human health and the environment. As the data will be provided to the regulators on a timely basis to make decisions on additional field activities, the additional field activities are not intended to consist of a separate "Phase" of investigation. See also the responses to General Comments #2-6.

Comment #3: Page 2, Section 2.0, ¶ 2 – Please amend the last sentence to read, "… to achieve the study goals and DQOs *specified on the previous page*.

Response: The DQOs are provided in Worksheet #11 in the QAPP.

Comment #4: Page 2, Section 2.0, ¶ 3 – The investigation of PFAS contamination at the Grove Pond wellfield is not an objective of the CERCLA RI. While the Area 1 FSP should collect data sufficient to identify/evaluate potential off-site impacts associated with PFAS emanating from the former Fort Devens site, the identification of potential source areas not associated with Devens should not be an acknowledged component of the CERCLA base-wide investigation of PFAS at the former Fort Devens Superfund site. Although Army has included the collection of samples from off-site locations in the Town of Ayer, the results will no bearing on the field work required

to adequately evaluate potential sources areas and impacts to nearby drinking water supply wells associated with previously confirmed PFAS detections at Devens.

Response: The Army understands the objective to characterize nature and extent and assess the risk of PFAS from Army sources. Upgradient samples are required to properly evaluate potential impacts to Grove Pond. The Army does not plan to delineate off-site sources of PFAS.

Comment #5: Page 3, Section 2.0, ¶ 5 - Additional surface water and sediment samples should be collected from the entire stretch of Cold Spring Brook originating at AOC 57 and continuing downgradient to Bowers Brook into Grove Pond.

Response: The number of surface water and sediment samples was increased based on EPA's input during the Area 1 sampling rationale working meeting (May 24, 2018). Surface water and sediment samples will be collected at eight locations along Cold Spring Brook (Figure 8).

Comment #6: Page 4, Section 5.0 - For reasons discussed in the General Comments 2 - 6 above, the currently proposed sampling program is inadequate for purposes of meeting the objectives identified in the May 2018 SI Report and for complying with requirements for conducting a CERCLA RI. While Army has indicated its willingness to expand the currently proposed sampling program, if warranted, as part of a subsequent field effort, this phased approach to adequately characterize the nature and extent of PFAS contamination at each of the PFAS AOCs will undoubtedly extend the timeframe required to complete the base- wide investigation of PFAS at the former Fort Devens.

Response: Refer to response to Page-Specific Comment #2.

Comment #7: Page 4, Section 5.1. AOCs 57, 74 and 75 – Upon closer evaluation of the proposed soil boring and vertical groundwater profiling locations for AOCs 57 and 74, EPA recommends that Army revise the proposed sampling program to focus more on the downgradient delineation of PFAS in the areas. Specifically, many of the proposed sample locations are less than 60 feet from previously confirmed PFAS detections and will do very little to further characterize the site or resolve long-standing issues, questions and assumptions regarding regional hydrogeology, shallow and deep groundwater flow and the potential off-site migration of contamination and impacts related thereto. EPA believes that sample collection over a wider area should be considered at this site to more effectively delineate and quantify PFAS contamination, both horizontally and vertically, and to make informed decisions, based on actual site data, regarding shallow and deep overburden groundwater flow and contaminant migration pathways.

Response: The proposed groundwater vertical profiling and soil sampling program for AOCs 74 and 57 encompass the area between potential source areas and/or known PFAS groundwater contamination and potential receptors and/or discharge areas for groundwater (i.e., Cold Spring Brook or the Grove Pond Municipal Well field). It is a reasonable approach to begin groundwater sampling investigation by advancing vertical profiling borings at areas of reported AFFF application or, at AOCs with no known source of PFAS identified yet, at borings located upgradient, cross gradient and downgradient of known PFAS groundwater contamination. The temporary well points or existing monitoring wells sampled at AOCs 74 and 57 during the SI only sampled water near the water table, therefore groundwater vertical profiling through the saturated overburden for the RI within the areas of PFAS detections is needed to determine the vertical extent of PFAS contamination in these areas and therefore, is not considered redundant to the water table sampling completed during the SI.

The sampling program at AOCs 74 and 75 is designed to characterize the extent of PFAS contamination in soil and groundwater between potential source areas and potential receptors and/or discharge points. In addition, as stated in Section 5.1.2 – AOC 57, 74, and 75 Sampling Plan, paragraph 1 of page 8; the potential for vertical hydraulic gradients in groundwater adjacent to Cold Spring Brook will be evaluated through the installation of overburden monitoring well couplets at AOCs 74 and 57. If groundwater vertical gradients measured at the well couplets and groundwater vertical profiling data collected from borings advanced on Devens adjacent to Cold Spring Brook indicate that the potential exists for PFAS groundwater contamination to underflow Cold Spring Brook then, as stated in Section 5.1.2 – AOC 57, 74 and 75 Sampling Plan, Groundwater Vertical Profiling, additional investigation further downgradient of AOCs 74 and 57 (i.e., east of Cold Spring Brook) will be completed.

Comment #8: Page 6, Section 5.1.2, Groundwater Vertical Profiling - As discussed in General Comment 4. above, EPA recommends that groundwater samples be collected at 5-foot intervals (from the top of the water table to bedrock) instead of the 10-foot intervals proposed. The collection of samples from more discrete sampling intervals will more accurately delineate PFAS contamination in the shallow and deep aquifer.

Response: See response to EPA General Comment #4.

Comment #9: Page 7, Section 5.1.2, Soil Borings – The draft Area FSP currently states that soil samples will be collected within 2 feet of the water table interface unless the water table is encountered at a depth less than 17 feet bgs. This could result in the deepest soil sample being as much as an 8-foot soil core extending to the water table. EPA recommends that the current protocol be amended to collect a 2-foot soil core at the water table for every sample by shortening the soil core directly above the 2-foot interval above the water table. This will allow for the collection of a 2-foot soil core at the water table.

Response: Page 7, paragraph 3, sentence 3 and 4 will be revised as follows:

"If the water table is encountered at a depth less than 17 ft bgs then the final soil sampling interval at the boring will be shortened by the appropriate amount to collect a separate 2-foot sample just above the water table to assess leaching threat to groundwater."

The sampling nomenclature, anticipated depths for the borings in Table 5 will be revised accordingly.

Comment #10: Page 7, Section 5.1.2, Soil Borings – Please elaborate on the specific sampling method that will be used to collect vertical profile samples.

Response: Per Section 7 of the FSP: "Groundwater vertical profile borings will be conducted in accordance with the procedure specified in Worksheet #17 of the UFP-QAPP and SOP-F014 (Direct Push Technology)." See also the response to Page-Specific Comment #1.

Comment #11: Page 8, Section 5.2, Grove Pond Wellfield – For reasons discussed in Page-Specific Comment 4. above, the purpose of the Area 1 PFAS RI should not include the identification of potential sources of PFAS associated with the Town of Ayer Grove Pond water supply wells that are unrelated to the PFAS AOCs at Devens. As previously stated, the primary objective of the CERCLA RI is to define the nature and extent of PFAS contamination at the former Fort Devens Superfund site and evaluate the possible off-base migration of PFAS-contamination and identify potential risks to human health and the environment associated with any off-base releases. To ensure integrity of the CERCLA process, EPA will refrain from commenting on aspects of the proposed sampling program that go beyond the requirements set forth in CERCLA.

Response: The Army understands the objective to characterize nature and extent and assess the risk of PFAS from Army sources. Collecting upgradient samples of potential impact areas is consistent with the CERCLA process. The Army does not plan to delineate off-base sources of PFAS.

Comment #12: Page 9, Section 5.2.2, Installation of New Monitoring Wells – As requested in EPA's comments on the June 25, 2018 comments on minutes of the May 24, 2018, Area 1 sampling design conference call and General Comment 3. above, permanent monitoring wells should be installed during the initial phase of the PFAS RI to replace the non-viable MNG wells to complete the transect of groundwater monitoring wells in this critical portion of Area 1.

Response: As described in Section 5.2.2 of the Area 1 FSP: Installation of up to eight new overburden wells and two bedrock wells (if needed [i.e., if vertical profiling data indicate that PFAS contamination in the overburden extends to bedrock]) are planned for the Grove Pond investigation area. As requested by EPA, the tentative locations for new monitoring wells are shown on Figure 7 and several are anticipated to be in the vicinity of the non-viable MNG wells. However, the final locations and screen settings of the new groundwater monitoring wells will be based on a review of the PFAS data obtained from groundwater vertical profiling, soil sampling and existing monitoring wells. The final locations and depths will be reviewed with EPA and MassDEP.

Comment #13: Page 11, Section 7.0, Field Procedures – This section should be amended to identify the specific procedures required for the collection of samples for each of the sampling techniques listed. Alternatively, Army could develop an area-specific QAPP for the Area 1 FSP, as recommended in EPA's April 30, 2018 email to Army. The Area 1 QAPP would be comprised of UFP-QAPP worksheets and SOPs relevant to and referenced in the Area 1 FSP.

Response: A listing of all applicable sampling procedures needed to implement the Area 1 FSP is provided in Section 7.0 of the FSP. Field sampling procedures are provided as attachments to the QAPP. The QAPP is for the entire PFAS RI; there are no area-specific QAPPs.